BOOK REVIEWS

Fundamentals of Radiation Protection

Hugh F. Henry. pp. xviii+485, $17.50, John Willey, New york.

While the sixties saw nuclear power become a reality the seventies will see it firmly established as one of the major power sources of many nations. At the same time man has suddenly become conscious that this progress is contributing to the fouling of his environment which may one day destroy all plant and animal life. The tragic consequences of atomic explosions at Hiroshima and Nagasaki and the widespread radioactive fallout of subsequent nuclear explosions have left man scared of the biological damage that might show up decades later As a result of all this, the common man, the worker in the atomic industries and a wide variety of people who come into contact with nuclear and high energy radiations all have to be reassured and taught how to handle them safely. The author has made an attempt to reach all these people in this book on "Fundamentals of Radiation Protection". The beginning chapters are devoted to atomic structure, mass-energy relationships, radiations, artificial and natural radioactivity, nuclear fission, half lives and radioactive equilibrium These are dealt with in very simple language, deriving equations and defining units of different quantities. The author has defined not only what is kinetic energy and potential energy but even what is energy, which was perhaps not necessary. In chapter II, it is said that the nucleus contains only protons and neutrons but in chapter III it is also stated that beta particles are emitted from the nucleus which the authors should have explained. This could have been done under nuclear stability by discussing the importance of neutron/proton ratio. Since the central theme of the book is how to protect the living tissues from radiations, the author has very rightly discussed the structure of the cell, the chemical constituents of the cell, how different organs have different sensitivity to radiation, and how this injury is repaired in the body. The physical aspects of radiation exposure is one chapter which could have been written better and more readable particularly the subject of density of ionisation.

In chapters VI and VII, the author has dealt with different kinds of exposure to radiation in the course of our normal life and specially for workers in the vicinity of radiation and examined in detail the consequences of such exposure. He has attempted to remove the fear of radiation and stressed some of the beneficial aspects also, like longevity at low exposure levels. In the chapter on 'Genetic Effects of Radiation' the reader is treated to the laws which govern "inheritance' and how radiation affects them. In the chapter on 'Internal Exposure Evaluations' actual methods of calculations have been illustrated which is of great practical importance.

The book discusses all aspects of personnel monitoring and environment monitoring for radioactivity and the methods to minimise exposure to individuals. It also deals with different kinds of emergencies that can arise in nuclear reactors. They have been illustrated by actual incidents and what was done and what should have been done.

The chapter on Administration is extremely helpful to anyone who is contemplating a health physics programme.

The chapter on 'Nuclear Weapons' is informative to those who are uninitiated in the subject, but would like to know how an atomic explosion takes place. However, the author has tried to justify the American use of nuclear weapons on Japan which is certainly out of place and is a highly controversial issue.

There are some errors and spelling mistakes. In chapter III, p. 31, the equation should be $^{234}_{90}Th \rightarrow {}^{234}_{91}Pa + {}^{0}_{-1}e$. In page 271, it should be $\sin^2 \theta/2 = 0.5$ instead of $\sin^2 0/2$ and on page 278, the equation should be $I = I_0 e^{-\beta\mu}\ m^x$ instead of $I_0 e^{-}\ em^x$. On p. 300, in the last sentence 'emphases' should be 'emphasis' and on p. 313, the end of the first paragraph 'extravagently' should read 'extravagantly'.

The references given at the end of each chapter and the questions are of great help to those who are taking a course in radiation protection. This can serve as a useful text book. The author, on the whole has given an excellent account of the several facets of radiation protection.

K. N. R.

The Sixth International Symposium on the Reactivity of Solids

Edited by Mitchell, De Vries, Roberts and Cannon. pp–852.
Wiley—Interscience.

The proceedings of the Sixth International symposium on the Reactivity of Solids held in Schenectady, New York, U.S A. from August 25-30, 1968, edited by Mitchell, DeVries, Roberts and Cannon comprise of erudite dissertation of certain topics of solid state chemistry of recent interest The book presents the various research papers read in the proceedings in a categorised form under eight sectional headings and does not attempt to develop the concepts *ab initio*. The paper entitled "Crystallographic shear and planar faults in solids" read as a Presidential Address by Prof. Wadsley in the first section advances a very ingenious explanation for the behaviour of non-stoichiometric oxides in terms of the localised shear planes and different crystallographic arrangements of the metal-oxygen tetrahedra. The crystal defect such as dislocation, vacancies, interstitials, Wagner defects etc. have been recognised undisputedly as playing a decisive role in many of the gas-solid, liquid-solid, and solid-solid reactions. The phenomena such as catalysis, diffusion, sintering etc. are clear manifestations of the integral part played by these defects in crystalline solids. The paper entitled "Role of crystal structure, defects, and cationic diffusion in the oxidation and reduction processes of iron oxides at low temperature" by Gazzarini *et al* is an immaculate description of the phase transformation relationship of iron oxides utilising the already mentioned ideas of crystal defects. It is not possible to discuss the salient features of all the 79 papers under eight general sections in the limited space available at my disposal. Nevertheless, it can be mentioned that the book entails many interesting discourses of profound scientific interest like decomposition of compounds, corrosion of metals,reaction kinetics of a sustance under various physical and chemical environments, crystallo-chemical characteristics of solids in relation to their reactivity, characterisation of ferrites, semiconductors, whiskers, pyrolytic carbon, phase transition of compounds, crystallization of glass, high pressure reaction of solids, etc. Further as this book is a compilation of several works carried out in different laboratories of the world, obviously some gaps, missing links and repetition of the same ideas may creep in the body of the book as a whole, which is unavoidable. However, all these in no way belittle its importance. This book will be very much useful to the researcher in general, particularly to those who are engaged in research pursuit in the aforesaid fields.

B. K. B.